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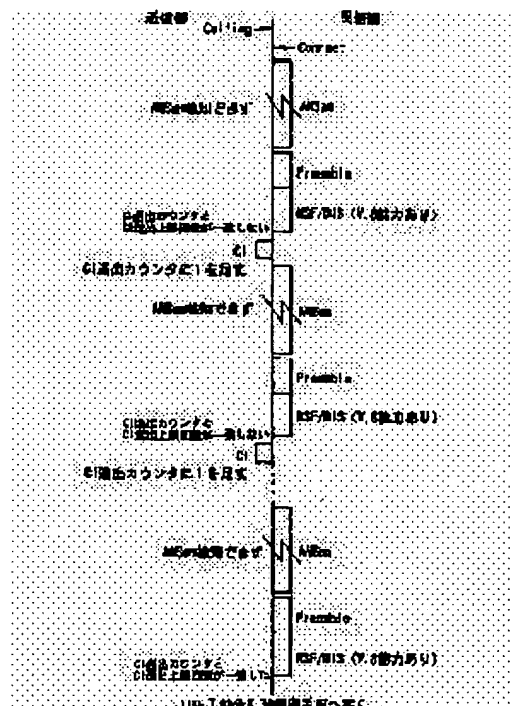
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(54) COMMUNICATION TERMINAL EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To avoid communication errors by preventing the repetition of digital identification signal(DIS) at a response station/CI signal transmission at a call originating station by performing communication in place of ITU-T recommendation T.30, when impossibility in the continuation of communication is judged during communication through a communication procedure based on ITU-T recommendation V.8.

SOLUTION: At the call originating station where a non-standard function identification signal (NSF)/DIS signal is received without detecting the reception of deformed response tone (ANSam) signal from the response station, it is judged whether or not the response station has the communication ability of ITU-T recommendation V.8. When it is judged that the response station has the ability, it is judged whether or not the number of times of CI signal transmission in such a case has reached an upper limit value, so



that possibility in the continuation of communication procedure based on the ITU-T recommendation V.8 can be judged. When it is judged that this procedure cannot be continued, communication is continued through the ordinary procedure of ITU-T recommendation T.30. Thus, even when the ANSam signal is not detected at the call originating station, no communication error occurs.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a communication terminal and relates to the communication terminal which can be communicated in more detail based on the communication procedure according to ITU-T recommendation V.8 and T.30.

[0002] In addition, ITU-T means International Telecommunication Union-Telecommunications Standardization Sector, i.e., the telecommunication standardization section of the International Telecommunications Union.

[0003]

[Description of the Prior Art] Conventionally, in ITU-T, the specification of the two-wire system full-duplex modem to 28800bps exceeding 14400bps is advised as V.34 as expansion of V.32 (specification of the two-wire system full-duplex modem to 9600bps). Then, ITU-T recommendation T.30ANNEXF was defined as specification which applies the above-mentioned V.34 to the communication procedure of facsimile apparatus.

[0004] In this ITU-T recommendation T.30ANNEXF, the responding station which received a message transmits a non-standard functional recognition signal (NSF signal) / digital recognition signal (DIS signal) to a call origination station side in a predetermined silent period, when the communication procedure which applied the deformation response tone (ANSam signal) to the call origination station correspondingly at predetermined time sending and ITU-T recommendation V.8 is not materialized. In addition, the information which shows whether there is any capacity (henceforth V.8 capacity) which communicates based on the communication procedure according to ITU-T recommendation V.8 to a responding station is included in a DIS signal.

[0005] It judges whether the call origination station which received the DIS signal from a responding station has V.8 capacity in a responding station based on a DIS signal, and when it is judged that there is V.8 capacity, a callout status signal (CI signal) is sent out to a responding station.

[0006] It shifts to the communication link based on the communication procedure which the responding station transmitted the deformation response tone (ANSam signal) to the call origination station by receiving this CI signal, and applied to ITU-T recommendation V.34 correspondingly between the call origination station and the responding station when it judged after that whether a communication link is possible based on the communication procedure according to ITU-T recommendation V.34 and it was judged that a communication link is possible based on the communication procedure according to ITU-T recommendation V.34.

[0007] By the way, in the communication procedure according to ITU-T recommendation V.8, it does not judge whether a call origination office can continue the communication link based on this communication procedure, but judges whether this communication link is continuable by the responding station. In this case, when it is judged that this communication link is uncontinuable by the responding station, it shifted to the ITU-T recommendation T.30 binary communication procedure, and the above-mentioned DIS signal is transmitted again. In addition, if V.8 capacity is in a responding station, the

information which shows that V.8 capacity is in this DIS signal transmitted again is included.

[0008]

[Problem(s) to be Solved by the Invention] However, when a responding station judges that the communication link based on the communication procedure according to ITU-T recommendation V.8 is uncontinuable by CI signal being unreceivable by some causes (for example, a circuit situation being bad), from a responding station, a DIS signal is again transmitted to a call origination office. Thus, if it judges that the call origination station which received the DIS signal has V.8 capacity in a call origination station based on the received DIS signal, CI signal is again sent out to a responding station. Therefore, the responding station judged that the communication link based on the communication procedure which could not receive this CI signal again but applied to ITU-T recommendation V.8 correspondingly is uncontinuable transmits a DIS signal to a call origination office again. Therefore, transmission of the DIS signal by the responding station and transmission of CI signal by the call origination station are repeated.

[0009] Moreover, when the ANSam signal from a responding station cannot be received, a call origination station goes into the receiving waiting of a DIS signal, judges whether V.8 capacity is receiving a DIS signal in a responding station, and when it is judged that there is V.8 capacity, it sends out CI signal to a responding station. Although the responding station which received this CI signal sends out an ANSam signal, a call origination station goes into the receiving waiting of a DIS signal again, when a call origination station cannot receive this ANSam signal. Therefore, transmission of the DIS signal by the responding station and transmission of CI signal by the call origination station are repeated.

[0010] Thus, the condition that transmission of the DIS signal by the responding station and transmission of CI signal by the call origination station are repeated will open a circuit as a communication link error, if predetermined carries out time amount continuation (deadline). Therefore, a communication link cannot be continued.

[0011] Moreover, as mentioned above, when it judges whether a communication link is possible based on the communication procedure according to ITU-T recommendation V.34 and it is judged that a communication link is impossible based on the communication procedure according to ITU-T recommendation V.34, the DIS signal mentioned above from the responding station is transmitted. However, if the information which shows that V.8 capacity is in this DIS signal is included, it will be judged whether based on the communication procedure according to ITU-T recommendation V.34, a communication link is possible again, and if this procedure is repeated and predetermined carries out time amount continuation (deadline), therefore, a circuit will be opened as a communication link error. Therefore, a communication link cannot be continued.

[0012] It aims at continuing a communication link or offering a possible communication terminal, without becoming a communication link error, even when it is judged that this invention cannot shift to the communication procedure which applied correspondingly at ITU-T recommendation V.34 during the communication link based on the communication procedure according to the case where the communication link based on the communication procedure which accomplished in view of the above-mentioned fact, and applied to ITU-T recommendation V.8 correspondingly is uncontinuable, or ITU-T recommendation V.8.

[0013]

[Means for Solving the Problem] The 1st means of communications which communicates based on the communication procedure to which the 1st invention applied to ITU-T recommendation V.8 correspondingly for the above-mentioned purpose achievement, A decision means to judge whether the communication link based on said communication procedure is continuable during the communication link based on said communication procedure by said 1st means of communications, When it is judged that said communication link is uncontinuable with said decision means, it has the 2nd means of communications which communicates based on the communication procedure which replaced with said means of communications and applied to ITU-T recommendation T.30 correspondingly.

[0014] Counting of the count to which said decision means sent out the callout status signal here is

carried out, counting of the count which received whether the deformation response tone was received by the time it had gone through [whether enumerated data turned into beyond the predetermined value and] predetermined time from reception of the first digital recognition signal, and a digital recognition signal is carried out, and you may make it judge any one of whether the enumerated data turned into beyond the predetermined value.

[0015] Moreover, the 1st means of communications which communicates based on the communication procedure to which the 2nd invention applied to ITU-T recommendation V.8 correspondingly, A decision means to judge whether it can shift to the communication procedure which applied correspondingly at ITU-T recommendation V.34 during the communication link based on said communication procedure by said 1st means of communications, When judged [that it cannot shift to the communication procedure which applied to ITU-T recommendation V.34 correspondingly with said decision means, and], it has the 2nd means of communications which communicates based on the communication procedure which replaced with said communication link operation and applied to ITU-T recommendation T.30 correspondingly.

[0016] Furthermore, the 3rd invention is equipped with a sending-out means send out the information which shows that it cannot communicate by said communication procedure when it is judged that said communication link is uncontinuable with a decision means judge whether the communication link based on said communication procedure is continuable during the communication link based on said communication procedure by the means of communications which communicates based on the communication procedure according to ITU-T recommendation V.8, and said means of communications, and said decision means.

[0017] Counting of the count to which said decision means received the callout status signal here is carried out, counting of the count which transmitted whether the callout menu signal was received by the time it had gone through [whether enumerated data turned into beyond the predetermined value and] predetermined time from transmission of the first deformation response tone, and a digital recognition signal is carried out, and you may make it judge any one of whether the enumerated data turned into beyond the predetermined value.

[0018] Moreover, the 4th invention is equipped with a sending-out means send out the information which shows that it cannot communicate by said communication procedure when judged [that it cannot shift to the communication procedure which applied correspondingly at ITU-T recommendation V.34 with a decision means judge whether it can shift to the communication procedure according to ITU-T recommendation V.34, and said decision means, during the communication link based on said communication procedure by the means of communications which communicates based on the communication procedure according to ITU-T recommendation V.8, and said means of communications, and].

[0019] That is, the 1st means of communications concerning the 1st invention communicates based on the communication procedure according to ITU-T recommendation V.8. In addition, it has a sending-out means to send out a call signal, and when a call signal is sent out by this sending-out means, you may make it the 1st means of communications communicate based on the communication procedure according to ITU-T recommendation V.8.

[0020] A decision means judges whether the communication link based on the above-mentioned communication procedure is continuable during the communication link based on the above-mentioned communication procedure by this 1st means of communications. In addition, a decision means carries out counting of the count which sent out the callout status signal, carries out counting of the count which received whether the deformation response tone was received by the time it had gone through [whether enumerated data turned into beyond the predetermined value and] predetermined time from reception of the first digital recognition signal, and a digital recognition signal, and judges any one of whether the enumerated data turned into beyond the predetermined value. In this case, it judges that the communication link based on the above-mentioned communication procedure cannot be continued when the result of this decision is affirmation, and when the result of this decision is negation, it is judged that the communication link based on the above-mentioned communication procedure is continuable.

[0021] The 2nd means of communications communicates based on the communication procedure which replaced with the above-mentioned means of communications, and applied to ITU-T recommendation T.30 correspondingly, when it is judged that the above-mentioned communication link is uncontinuable with a decision means.

[0022] Thus, it communicates based on the communication procedure which replaced with the communication procedure according to ITU-T recommendation V.8, and applied correspondingly at ITU-T recommendation T.30 during the communication link based on the communication procedure according to ITU-T recommendation V.8 when it was judged that this communication link is uncontinuable. In this case, since it does not carry out sending out CI signal when the DIS signal with which the information which shows that there is V.8 capacity peculiar to the communication procedure according to ITU-T recommendation V.8 in the communication procedure according to ITU-T recommendation T.30 was included is received, an ANSam signal is not sent out from a responding station, either. Therefore, the communication link based on the communication procedure according to ITU-T recommendation T.30 can be continued, without being able to prevent that transmission of the DIS signal by the responding station and transmission of CI signal by the call origination office are repeated, and becoming a communication link error.

[0023] The 1st means of communications concerning the 2nd invention communicates based on the communication procedure according to ITU-T recommendation V.8. It judges whether a decision means can shift to the communication procedure which applied correspondingly at ITU-T recommendation V.34 during the communication link based on the above-mentioned communication procedure by this 1st means of communications.

[0024] The 2nd means of communications communicates based on the communication procedure which replaced with the above-mentioned means of communications, and applied to ITU-T recommendation T.30 correspondingly, when judged [that it cannot shift to the communication procedure which applied to ITU-T recommendation V.34 correspondingly with the decision means, and].

[0025] Thus, during the communication link based on the communication procedure according to ITU-T recommendation V.8 When judged [that it cannot shift to the communication procedure according to ITU-T recommendation V.34, and], in order to communicate based on the communication procedure which replaced with the above-mentioned means of communications, and applied to ITU-T recommendation T.30 correspondingly, V. even if it receives the DIS signal with which the information which shows that there is 8 capacity was included, in the communication procedure according to ITU-T recommendation T.30 A communication link can be continued by the communication procedure according to ITU-T recommendation T.30, without being able to prevent the repeat stage of this decision and becoming a communication link error, since it does not judge again whether it can shift to the communication procedure according to ITU-T recommendation V.34.

[0026] Moreover, the means of communications concerning the 3rd invention communicates based on the communication procedure according to ITU-T recommendation V.8. In addition, it has a detection means to detect arrival of the mail, and when arrival of the mail is detected by this detection means, you may make it means of communications communicate based on the communication procedure according to ITU-T recommendation V.8.

[0027] A decision means judges whether the communication link based on the above-mentioned communication procedure is continuable during the communication link based on the above-mentioned communication procedure by means of communications. A decision means carries out counting of the count which received the callout status signal, carries out counting of the count which transmitted whether the callout menu signal was received by the time it had gone through [whether enumerated data turned into beyond the predetermined value and] predetermined time from transmission of the first deformation response tone, and a digital recognition signal, and judges any one of whether the enumerated data turned into beyond the predetermined value. In this case, it judges that the communication link based on the above-mentioned communication procedure cannot be continued when the result of this decision is affirmation, and when the result of this decision is negation, it is judged that the communication link based on the above-mentioned communication procedure is continuable.

[0028] A sending-out means sends out the information which shows that it cannot communicate by the above-mentioned communication procedure, when it is judged that said communication link is uncontinuable with a decision means.

[0029] Thus, when it is judged based on the communication procedure according to ITU-T recommendation V.8 that the communication link based on the above-mentioned communication procedure is uncontinuable during a communication link, the information which shows that it cannot communicate by the above-mentioned communication procedure is sent out. In this case, in order to judge that there is no call origination station of V.8 capacity in a responding station, CI signal is not sent out from a call origination station. Therefore, a communication link can be continued by the communication procedure according to ITU-T recommendation T.30, without being able to prevent that transmission of the DIS signal by the responding station produced when a responding station does not receive CI signal, and transmission of CI signal by the call origination office are repeated, and becoming a communication link error.

[0030] The means of communications concerning the 4th invention communicates based on the communication procedure according to ITU-T recommendation V.8. It judges whether a decision means can shift to the communication procedure which applied to ITU-T recommendation V.34 correspondingly during the communication link based on said communication procedure by means of communications, and a sending-out means sends out the information which shows that it cannot communicate by the above-mentioned communication procedure, when judged [that it cannot shift to the communication procedure which applied to ITU-T recommendation V.34 correspondingly with the decision means, and].

[0031] Thus, since the information which shows that it cannot communicate by the above-mentioned communication procedure is sent out when judged [that it cannot shift to the communication procedure which applied correspondingly during the communication link at ITU-T recommendation V.34 based on the communication procedure according to ITU-T recommendation V.8, and], the communication link based on the communication procedure according to ITU-T recommendation V.8 is not performed. Therefore, a communication link can be continued by the communication procedure according to ITU-T recommendation T.30, without being able to prevent the repeat of this decision and becoming a communication link error, since it does not judge again whether it can shift to the communication procedure according to ITU-T recommendation V.34.

[0032] Moreover, in these specifications, it writes in a corresponding abbreviation about the following various signals including the signal mentioned above.

[0033]

[Table 1]

信号名	略語
変形応答トーン	ANS a m 信号
起呼メニュー信号	CM 信号
共通メニュー信号	JM 信号
CM 終端子	CJ 信号
起呼表示信号	CI 信号
被呼局識別信号	CED 信号
非標準機能識別信号	NSF 信号
デジタル識別信号	DIS 信号

[0034] Furthermore, the signal defined as ITU-T recommendation V.8 among the above-mentioned signals is explained.

[0035] A deformation response tone (ANSam signal) is the 2100 Hertz cosine signal which performed

amplitude modulation. In more detail, a phase is reversed at intervals of 450×25 ms, and amplitude modulation of the 2100×1 Hertz cosine wave signal is carried out by the further 15×0.1 Hertz cosine wave. The range of the long duration mean amplitude of the amplitude of the modulated wave-like envelope must be (0.8×0.01) to (1.2×0.01) .

[0036] A callout menu signal (CM signal) is a signal transmitted from the communication terminal (call origination station) of the side which carried out call origination, and it is used in order to mainly display an available modulation technique by the call origination station. This CM signal consists of 300bps repetitive bit strings modulated by the low-pass channel V.21 (L) defined by advice V.21. If it explains in more detail, one CM signal will start with the 10-bit synchronous sign following "1" and them of them, and the callout function currently demanded will be expressed as the information category of the beginning in CM signal based on a predetermined callout functional category. Furthermore, CM signal must include one or the octet beyond it which shows usable modulation mode in a call origination office.

[0037] A common menu signal (JM signal) is a signal transmitted from the communication terminal (responding station) of the side which carried out the call in, and it is used in order to mainly display an available modulation technique in common by the call origination station and the responding station. This JM signal consists of 300bps repetitive bit strings modulated by the high region channel V.21 (H) defined by advice V.21. If it explains in more detail, one JM signal will start with the 10-bit synchronous sign following "1" and them of them, and the same callout function as received CM signal will be expressed as the information category of the beginning in JM signal. However, when the callout function cannot use it by the responding station, a different callout function may be expressed as JM signal. Moreover, while JM signal is in modulation mode displayed by CM signal, it must include the octet which displays all usable modulation modes by the responding station in the modulation mode used in relation to the callout function displayed by this CM signal.

[0038] CM termination child (CJ signal) is a signal which shows termination of the check which detected JM signal, and CM signal. It becomes irregular by V.21 [300bps] (L), and this CJ signal consists of octets of three continuous all "0" containing a start bit and a stop bit.

[0039] A callout status signal (CI signal) is a signal transmitted in order to show general communication facility from a call origination station, and is transmitted at regular ON / off spacing from a call origination station. The "on" period of the persistence time is indispensable in 2.0 or less seconds, including at least three or more CI signals. The persistence time of a "off" period is indispensable in 2.0 or less seconds 0.4 seconds or more. One CI signal consists of the 10-bit synchronous signs and callout functional octets following "1" and them of them. In addition, the signal of a "on" period consists of 300bps repetitive bit strings modulated by the low-pass channel V.21 (L) defined by advice V.21.

[0040]

[Embodiment of the Invention] Hereafter, the gestalt of operation of the 1st of this invention is explained to a detail with reference to a drawing.

[0041] The whole facsimile apparatus 10 block diagram is shown in [facsimile apparatus whole configuration] drawing 1 as an example of the communication terminal concerning this invention. This facsimile apparatus 10 As CPU12 which performs control processing of the facsimile apparatus 10 whole, and a work area used at the time of control program activation The actuation display 16 with which the display and actuation switch for operating ** RAM 14 and facsimile apparatus 10 were formed, the reader 18 which reads a transmitting manuscript, receiving drawing information, etc. are printed. The printer 20 to output, Image processings, such as coding, a decryption, and zooming The system control program storage section 28, the digital network (for example) which consisted of ROMs which memorized the program which controls the image storage equipment 24 and facsimile apparatus 10 whole which stores the image processing system 22 to perform, the drawing information to transmit, or the received drawing information The digital-communication control program storage section 30, the analog network which consisted of ROMs which memorized the program for controlling the communication link (for example, G4) suitable for an ISDN network (For example) The communication link suitable for G3) The program for controlling By the analog network control unit 40 for connecting

the digital network control unit 38 for connecting the analog communication control program storage section 32 and facsimile apparatus 10 which consisted of memorized ROMs to a digital network, and facsimile apparatus 10 to an analog network, and change It has the circuit switching control 36 for connecting two or more external circuit interfaces and two or more internal communication circuits, and these are mutually connected by the system bus 26.

[0042] Moreover, the digital-communication control program storage section 30 is mutually connected with the direct line switching control 36, and the analog communication control program storage section 32 is mutually connected with the circuit switching control 36 through the modem (modem) 34 equipped with a slow mode and fast mode. Moreover, the circuit switching control 36 is mutually connected also with each of the digital network control unit 38 and the analog network control unit 40.

[0043] Although the facsimile apparatus 10 of this operation gestalt is connectable also with an analog network also at a digital network, when connecting this facsimile apparatus 10 only to an analog network, the digital-communication control program storage section 30 and the digital network control device 38 can be omitted, and when connecting only with a digital network, the analog communication control program storage section 32, a modem 34, and the analog network control unit 40 can be omitted.

[0044] [The outline of the fundamental communication procedure of ITU-T recommendation T.30 ANNEXF], next the outline of the fundamental communication procedure of ITU-T recommendation T.30 ANNEXF are explained. The fundamental communication procedure of T.30 ANNEXF is shown in drawing 2, and the signal with which the signal sent out from a call origination office to a responding station is sent out to the right-hand side of a center line from a responding station in a call origination office is shown in the left-hand side of a center line sequentially from the top in accordance with time series, respectively.

[0045] The procedure at the time of communication link initiation, the procedure at the time of transmission of drawing information, and the procedure at the time of communication link termination are covered by this drawing 2. Among these, network interaction for the procedure at the time of communication link initiation to recognize the function of an other party terminal etc. (phase 1), Rhine probing for grasping the condition of the communication line set up between the call origination station and the responding station (phase 2), Primary channel equalizer training which trains the equalizer built in the modem (phase 3), The modem parameter exchange which exchanges the engine-performance information on a modem etc. and performs a setup of a data signaling rate etc. (phase 4), It is constituted by each phase of the resynchronization (phase 6) of a primary channel which synchronizes a primary channel again in advance of transmission of the T.30 facsimile handshake (phase 5) and drawing information that exchange of control channel data etc. is performed in advance of transmission of drawing information.

[0046] In addition, among these, by network interaction, the communication link based on the communication procedure (henceforth V.8 communication procedure) according to ITU-T recommendation V.8 is performed, and, henceforth [the following Rhine probing], actuation based on the half-duplex mode of operation of V.34 is performed.

[0047] Since a [outline of ITU-T recommendation T.30 binary communication procedure] ITU-T recommendation T.30 binary communication procedure is common knowledge, detailed explanation is omitted, but as shown in drawing 3, after carrying out the call in of the responding station (Connect), it sends out a CED signal and a low-speed (for example, 300bps) NSF/DIS signal to a call origination office. In addition, the DIS signal is constituted by a preamble, Flag F, an address field A, a control field C, facsimile control field FCF, facsimile information field FIF, the frame checking sequence FCS, and Flag F as shown in drawing 4. In addition, the 1st byte of triplet eye of the facsimile information field FIF is set to 1, when there is no V.8 capacity in a responding station and V.8 capacity is in 0 and a responding station. Therefore, it can judge whether the call origination office which received the DIS signal has V.8 capacity in a responding station, when the 1st byte of triplet eye of the facsimile information field FIF of a DIS signal judges 1 or 0.

[0048] Here, the fundamental communication procedure of network interaction (phase 1) is explained to

a detail using drawing 5 and drawing 6.

[0049] It is step 52 of drawing 5, the facsimile apparatus (call origination office) 10 concerning this gestalt sends out a dial tone (call signal) (Calling of drawing 6 reference), when dial termination is carried out (step 54;Y), are steps 56 and 58 and goes into the receiving waiting of an ANSam signal, and a NSF signal / DIS signal.

[0050] At step 56, an ANSam signal and when it is judged that it received, V.ITU-T recommendation 8 usual communication procedure mentioned later is continued by step 80.

[0051] When it is judged at step 58 that the NSF signal / DIS signal was received, CI sending-out counter which counts the count which sent out CI signal at step 60 is set to 0, and it judges whether based on a DIS signal, V.8 capacity is in a responding station at step 62. When it is judged that there is no V.8 capacity in a responding station, T.ITU-T recommendation 30 usual procedure is performed at step 82.

[0052] On the other hand, when it is judged at step 62 that V.8 capacity is in a responding station, it judges whether the upper limit of the count to which the value of CI sending-out counter sends out CI signal was reached at step 64. When it is judged that the upper limit of the count to which the value of CI sending-out counter sends out CI signal was reached, at step 82, the 300bps DCS command is sent out and T.ITU-T recommendation 30 usual procedure is performed.

[0053] When it is judged that the upper limit of the count to which the value of CI sending-out counter sends out CI signal is not reached on the other hand, at step 66, CI signal is sent out, CI sending-out counter is incremented one time at step 68, and it judges whether the ANSam signal was received at step 70.

[0054] It goes into the receiving waiting of an ANSam signal, and a NSF signal / DIS signal at steps 70 and 72. At step 72, when it is judged that the NSF signal / DIS signal is not received, it returns to step 66 and the above processing (step 66 - step 72) is repeated.

[0055] When it is judged at step 70 that the ANSam signal was received from the responding station, V.ITU-T recommendation 8 usual communication procedure is continued at step 80.

[0056] At step 72, when it is judged that the NSF signal / DIS signal was received from the responding station, it returns to step 62 and the above processing (step 62 - step 72) is repeated.

[0057] Next, a continuation of V.ITU-T recommendation 8 usual communication procedure of step 80 is explained with reference to drawing 7. As mentioned above, when an ANSam signal is received, CM signal which includes the communication capability information on a call origination station (for example, ***** [having the activation capacity of a V.34 procedure] etc.) at step 204 is sent out to a responding station following the silent period during Te second specified beforehand (0.5 seconds or more) (step 202). This CM signal makes an upper limit T 1 hour specified beforehand, and two or more transfer appearance of the time of sending out of CJ signal mentioned later is carried out.

[0058] A call origination station receives JM signal at step 206 after sending-out initiation of this CM signal following an ANSam signal from a responding station. This JM signal includes the information on communication capability that a responding station can also be performed, among the communication capability expressed with the above-mentioned CM signal, and two or more transfer appearance is carried out from a responding station. A call origination office can recognize common communication capability by the call origination office and the responding station by receiving this JM signal.

[0059] If the same JM signal is received twice or more (step 206;Y), a call origination station is step 208 and sends out CJ signal which shows termination of CM signal to a responding station. the silent period (step 212) of 75after sending out CJ signal three octets by call origination station here (step 210;Y)**5 ms -- then, it shifts to the execution phase (phase after Rhine probing (phase 2)) of a V.34 procedure at step 214.

[0060] the silent period (step 304) of at least 200 mses after, carrying out the call in of the responding station with V.8 capacity on the other hand (step 302 of drawing 8) -- then, an ANSam signal is sent out to a call origination office (step 306). However, at this time, there is also a case which sends out a CED signal, a preamble, and low-speed (for example, 300bps) low-speed NSF / DIS signal to a call

origination office according to the T.30 binary procedure shown in drawing 3.

[0061] Then, receiving waiting of CM signal from a call origination station or CI signal is performed (steps 308 and 220). And a responding station sends out JM signal to a responding station, if the same CM signal is received twice or more (step 312). (if affirmed at step 310) By making into an upper limit T 1 hour specified beforehand, two or more transfer appearance of this JM signal is carried out until it receives CJ signal mentioned later three octets.

[0062] A responding station goes into the receiving waiting of CJ signal after sending-out initiation of this JM signal following CM signal from a call origination station (step 314). if CJ signal is received three octets here (if affirmed at step 314) -- a responding station -- the silent period (step 316) of 75**5 ms -- then, it shifts to the execution phase (phase after Rhine probing (phase 2)) of a V.34 procedure (step 318).

[0063] In addition, in steps 308 and 220, when CM signal or CI signal is not able to be received in predetermined time (for example, permission ANSam signal sending-out time amount Tr second (specifically 5 **1 second)), either, it shifts to a T.30 binary procedure (step 326). (namely, when affirmed at step 324)

[0064] However, when CI signal is received, an ANSam signal is sent out again (step 322), and it returns to the receiving waiting of CM signal of step 308.

[0065] As mentioned above, the call origination station which could not detect reception of an ANSam signal but received the NSF signal / DIS signal By judging whether the count of sending out of CI signal sent out when it judges whether V.8 capacity is in a responding station and it is judged that V.8 capacity is in a responding station reached the upper limit V. Since it is made to continue a communication link in T.ITU-T recommendation 30 usual procedure when it judges whether it can continue eight communication procedures and it is judged that it cannot continue V.8 communication procedure A communication link can be continued by the communication procedure of usual ITU-T recommendation T.30, without becoming a communication link error, even when an ANSam signal is not detected in a call origination office.

[0066] In addition, although the gestalt of the operation explained above explained taking the case of the case where a call origination office cannot detect reception of the ANSam signal from a responding station, this invention is not limited to this, and when a responding station cannot receive CI signal from a call origination office, but is that the deadline of it is passed and an ANSam signal is not sent out from a responding station, it can be applied similarly.

[0067] Next, the gestalt of operation of the 2nd of this invention is explained. Since this gestalt is the same configuration as the gestalt of the 1st operation mentioned above, it omits the explanation.

[0068] Next, although an operation of this gestalt is explained with reference to drawing 9 and drawing 10, since it is the same as that of an operation of the gestalt of the 1st operation, and abbreviation, the same sign is given to the same part, the explanation is omitted, and an operation of this gestalt explains only a different part mentioned above.

[0069] The facsimile apparatus (call origination office) 10 concerning this gestalt performs the control routine shown in drawing 9, it is step 58, and when a NSF signal / DIS signal is judged to be ***** from a responding station, is step 86 and starts CI sending-out timer. It judges whether at the following step 62, when it was judged that V.8 capacity is in a responding station, CI sending-out timer judged and carried out the time-out of whether to have been in agreement with CI sending-out upper limit time amount by step 88. When CI sending-out timer has not carried out a time-out, steps 66, 70, and 72 are performed in order, when CI sending-out timer carries out a time-out, it progresses to step 82, the 300bps DCS command is sent out, and T.ITU-T recommendation 30 usual procedure is performed.

[0070] As shown also in drawing 10, thus, the call origination office which could not detect reception of an ANSam signal but received the NSF signal / DIS signal By judging whether when it judged whether V.8 capacity is in a responding station and it was judged that V.8 capacity is in a responding station, CI sending-out timer started when a DIS signal was received first passed the deadline of V. Since it is made to continue a communication link in T.ITU-T recommendation 30 usual procedure when it judges whether it can continue eight communication procedures and it is judged that it cannot

continue V.8 communication procedure A communication link can be continued by the communication procedure of usual ITU-T recommendation T.30, without becoming a communication link error, even when an ANSam signal is not detected in a call origination office.

[0071] In addition, although the gestalt of the operation explained above explained taking the case of the case where a call origination office cannot detect reception of the ANSam signal from a responding station, this invention is not limited to this, and when a responding station cannot receive CI signal from a call origination office, but is that the deadline of it is passed and an ANSam signal is not sent out from a responding station, it can be applied similarly.

[0072] Next, the gestalt of operation of the 3rd of this invention is explained. Since this gestalt is the same configuration as the gestalt of the 1st operation mentioned above, it omits the explanation.

[0073] Next, although an operation of this gestalt is explained with reference to drawing 11 and drawing 12, since it is the same as that of an operation of the gestalt of the 1st operation, and abbreviation, the same sign is given to the same part, the explanation is omitted, and an operation of this gestalt explains only a different part mentioned above.

[0074] When the control routine shown in drawing 11 is performed and is judged to be dial termination at step 54, the facsimile apparatus (call origination office) 10 concerning this gestalt is step 90, and sets to 0 the DIS receiving counter which counts the count which received the DIS signal. Moreover, when a NSF signal / DIS signal is judged to be ***** from a responding station at step 58, a DIS receiving counter is incremented one time at step 92. Furthermore, when it is judged at step 62 that V.8 capacity is in a responding station, it judges whether the DIS receiving counter reached the upper limit of a count which receives a DIS signal at step 94. When it is judged that the upper limit of the count to which steps 66, 70, and 72 are performed in order, and a DIS receiving counter receives a DIS signal when it is judged that the DIS receiving counter has not reached the upper limit of a count which receives a DIS signal was reached, it progresses to step 82, the 300bps DCS command is sent out, and T.ITU-T recommendation 30 usual procedure is performed.

[0075] Thus, by being unable to detect reception of an ANSam signal but judging whether the count (DIS receiving counter) which received the DIS signal reached the upper limit of a count which receives a DIS signal, as shown also in drawing 12 V. Since it is made to continue a communication link in T.ITU-T recommendation 30 usual procedure when it judges whether it can continue eight communication procedures and it is judged that it cannot continue V.8 communication procedure A communication link can be continued by the communication procedure of usual ITU-T recommendation T.30, without becoming a communication link error, even when an ANSam signal is not detected in a call origination office.

[0076] In addition, although the gestalt of the operation explained above explained taking the case of the case where a call origination office cannot detect reception of the ANSam signal from a responding station, this invention is not limited to this, and when a responding station cannot receive CI signal from a call origination office, but is that the deadline of it is passed and an ANSam signal is not sent out from a responding station, it can be applied similarly.

[0077] Next, the gestalt of operation of the 4th of this invention is explained. Since this gestalt is the same configuration as the gestalt of the 3rd operation mentioned above, it omits the explanation.

[0078] Next, although an operation of this gestalt is explained with reference to drawing 13 and drawing 14, since it is the same as that of an operation of the gestalt of the 3rd operation, and abbreviation, the same sign is given to the same part, the explanation is omitted, and an operation of this gestalt explains only a different part mentioned above.

[0079] The facsimile apparatus (call origination office) 10 concerning this gestalt performs the control routine shown in drawing 13, it is step 58, and when a NSF signal / DIS signal is judged to be ***** from a responding station, it is step 100 and performs processing (step 92 - step 72 (refer to drawing 11)) mentioned above.

[0080] When it is judged that it judged that the ANSam signal was received from the responding station, namely, V.8 communication procedure can be continued at step 56, CM signal is sent out to a responding station at step 102. In addition, as CM signal was mentioned above, two or more transfer

appearance of the time of sending out of CJ signal mentioned later is carried out by making into an upper limit T 1 hour specified beforehand.

[0081] A call origination station receives JM signal after sending-out initiation of this CM signal following an ANSam signal from a responding station (step 104;Y). This JM signal includes the information on communication capability that a responding station can also be performed, among the communication capability expressed with the above-mentioned CM signal, and two or more transfer appearance is carried out from a responding station. A call origination office can recognize common communication capability by the call origination office and the responding station by receiving this JM signal.

[0082] Reception of the same JM signal twice or more sends out CJ signal which shows termination of CM signal to 3 octet responding station at the following step 106.

[0083] And CM signal is performed at step 108 and JM signal performs a negotiation. As a result of a negotiation, when it can communicate by the communication procedure of V.34, it shifts to the communication procedure of the usual ITU-T recommendation T.30ANNEXF at step 110, and when it cannot communicate by the communication procedure of V.34, T.ITU-T recommendation 30 usual procedure is performed at step 82.

[0084] Thus, as a result of the negotiation in CM signal under communication link based on V.8 communication procedure, and JM signal, when it cannot communicate by the communication procedure of V.34, the communication link based on V.8 communication procedure is ended, and it is made to perform T.ITU-T recommendation 30 usual procedure. Therefore, a communication link can be continued by the communication procedure of usual ITU-T recommendation T.30, without not performing the above-mentioned negotiation but becoming a communication link error again, even if it receives a DIS signal from a responding station (V. there is 8 communication capability) after that.

[0085] In addition, at step 100, it replaces with step 92 - step 72 (refer to drawing 11), and may be made to perform step 60 - step 72 (to refer to drawing 5) or step 86 - step 72 (to refer to drawing 9). In addition, processing of step 90 is omitted in this case.

[0086] Next, the gestalt of operation of the 5th of this invention is explained. Since this gestalt is the same configuration as the gestalt of the 1st operation mentioned above, it omits the explanation.

[0087] Next, an operation of this gestalt is explained with reference to drawing 15 and drawing 16 . After the dial tone of a call origination office answering and carrying out a call in (step 112;Y and drawing 16 Connect reference), it is step 114, and the facsimile apparatus (responding station) 10 concerning this gestalt sets to 0 CI receiving counter which counts the count which received CI signal, it is step 116 and sends out an ANSam signal.

[0088] When it judges whether CM signal was received and CM signal is received at the following step 118, the communication procedure of usual ITU-T recommendation V.8 is continued at step 130 (refer to step 310 - step 318, and drawing 8).

[0089] If an ANSam signal is not detected in a call origination office and CM signal is not sent out from a call origination office as shown in drawing 16 , it judges that CM signal is not received at step 118, and a NSF/DIS signal is sent out to a call origination office at step 120 in this case. In addition, the information which shows that V.8 capacity is in a responding station is included in a DIS signal.

[0090] When it judges whether the preamble was received or not and a preamble is received at the following step 122, the communication procedure of usual ITU-T recommendation T.30 is performed at step 134.

[0091] When it is judged at step 122 that the preamble is not received, it judges whether CI signal was received at step 124. When it is judged that CI signal is not received, it returns to step 120 and the above processing (step 120 - step 124) is performed.

[0092] When it is judged at step 124 that CI signal was received, it judges whether the value of CI receiving counter reached the upper limit of a count which receives CI signal at step 126. At step 126, when [which was judged] the value of CI receiving counter has not reached the upper limit of a count which receives CI signal, by step 128, CI receiving counter is incremented one time and it returns to step 116. When it is judged that the value of CI receiving counter, on the other hand, reached the upper limit

of a count which receives CI signal at step 126, a NSF/DIS signal is sent out to a call origination station at step 136. In this case, the information which shows that there is no V.8 capacity in a responding station is included in a DIS signal. Thereby, a call origination station judges that there is no responding station of V.8 capacity. Therefore, a communication link is continued by the communication procedure of usual ITU-T recommendation T.30 between a call origination station and a responding station (step 138).

[0093] Thus, by not detecting the sent-out ANSam signal in a call origination office, but receiving not CM signal but CI signal, and judging whether the count of reception of this CI signal became a upper limit, as shown also in drawing 16 V, by sending out a DIS signal including the information which shows that there is no V.8 capacity in a responding station to a call origination office, when it judges whether eight communication procedures are continuable and it is judged that V.8 communication procedure is uncontinuable A communication link can be continued by the communication procedure of usual ITU-T recommendation T.30, without becoming a communication link error, even when the sent-out ANSam signal is not detected in a call origination office since it is made to continue a communication link by the communication procedure of ITU-T recommendation T.30.

[0094] Next, the gestalt of operation of the 6th of this invention is explained. Since this gestalt is the same configuration as the gestalt of the 5th operation mentioned above, it omits the explanation.

[0095] Next, although an operation of this gestalt is explained with reference to drawing 17 and drawing 18, since it is the same as that of an operation of the gestalt of the 5th operation, and abbreviation, the same sign is given to the same part, the explanation is omitted, and an operation of this gestalt explains only a different part mentioned above.

[0096] The facsimile apparatus (responding station) 10 concerning this gestalt performs the control routine shown in drawing 17, and performs step 116 after step 112. When it is judged at step 118 that CM signal is not received, at the following step 140, a DIS sending-out timer is started and it judges whether the DIS sending-out timer passed the deadline of at step 142, and when it is judged that the DIS sending-out timer passed the deadline of, it progresses to step 136.

[0097] On the other hand, when it is judged at step 142 that the DIS sending-out timer has not passed the deadline of, step 120 - step 124 are performed, when it is judged that CI signal was received at step 124, an ANSam signal is sent out at step 144, and it judges whether CM signal was received at step 146. When CM signal is received, the communication procedure of usual ITU-T recommendation V.8 is continued at step 130, and when CM signal is not received, it returns to step 142.

[0098] Therefore, by not detecting the sent-out ANSam signal in a call origination office, but judging whether the DIS sending-out timer started when it was judged first that CM signal was not received passed the deadline of, as shown also in drawing 18 V, by sending out a DIS signal including the information which shows that there is no V.8 capacity in a responding station to a call origination office, when it judges whether eight communication procedures are continuable and it is judged that V.8 communication procedure is uncontinuable A communication link can be continued by the communication procedure of usual ITU-T recommendation T.30, without becoming a communication link error, even when the sent-out ANSam signal is not detected in a call origination office since it is made to continue a communication link by the communication procedure of ITU-T recommendation T.30.

[0099] Next, the gestalt of operation of the 7th of this invention is explained. Since this gestalt is the same configuration as the gestalt of the 6th operation mentioned above, it omits the explanation.

[0100] Next, although an operation of this gestalt is explained with reference to drawing 19 and drawing 20, since it is the same as that of an operation of the gestalt of the 6th operation, and abbreviation, the same sign is given to the same part, the explanation is omitted, and an operation of this gestalt explains only a different part mentioned above.

[0101] The facsimile apparatus (responding station) 10 concerning this gestalt performs the control routine shown in drawing 19, is step 118, sets to 0 the DIS sending-out counter which is step 152 and counts the count of sending out of a DIS signal when it is judged that CM signal did not receive, is step 154, and judges whether the value of a DIS sending-out counter reached the upper limit of the count

which sends out a DIS signal. When the value of a DIS sending-out counter has not reached the upper limit of the count which sends out a DIS signal, after performing step 120, at step 156, a DIS sending-out counter is incremented one time, and step 122 - step 146 are performed. On the other hand, when the value of a DIS sending-out counter reaches the upper limit of the count which sends out a DIS signal, it progresses to steps 136 and 138.

[0102] Therefore, as shown also in drawing 20, the sent-out ANSam signal is not detected in a call origination office. By judging whether when CM signal was not received, the DIS sending-out counter which increments whenever it sends out a DIS signal reached the upper limit V. by sending out a DIS signal including the information which shows that there is no V.8 capacity in a responding station to a call origination office, when it judges whether eight communication procedures are continuable and it is judged that V.8 communication procedure is uncontinuable A communication link can be continued by the communication procedure of usual ITU-T recommendation T.30, without becoming a communication link error, even when the sent-out ANSam signal is not detected in a call origination office since it is made to continue a communication link by the communication procedure of ITU-T recommendation T.30.

[0103] Next, the gestalt of operation of the 8th of this invention is explained. Since this gestalt is the same configuration as the gestalt of the 7th operation mentioned above, it omits the explanation.

[0104] Next, although an operation of this gestalt is explained with reference to drawing 21 and drawing 22, since it is the same as that of an operation of the gestalt of the 7th operation, and abbreviation, the same sign is given to the same part, the explanation is omitted, and an operation of this gestalt explains only a different part mentioned above.

[0105] The facsimile apparatus (call origination office) 10 concerning this gestalt performs the control routine shown in drawing 21, and performs processing (step 152 - step 146 (refer to drawing 19)) which was step 118, is step 160 and was mentioned above when it was judged that CM signal is not received.

[0106] When it judges that CM signal was received, namely, it is judged to V.8 communication procedure at step 118 that shift is possible, JM signal is sent out to a responding station at step 162. By making into an upper limit T 1 hour specified beforehand, two or more transfer appearance of this JM signal is carried out until it receives CJ signal mentioned later three octets.

[0107] It goes into the receiving waiting of CJ signal at step 164 after sending-out initiation of this JM signal following CM signal from a call origination station. If CJ signal is received three octets here, the affirmation judging of step 164 is carried out, CM signal will be performed at step 166 and it will perform a negotiation by JM signal. As a result of a negotiation, when it can communicate by the communication procedure of V.34, at step 168, it shifts to the communication procedure of the usual ITU-T recommendation T.30ANNEXF, and when it cannot communicate by the communication procedure of V.34, it progresses to steps 136 and 138.

[0108] Thus, a communication link can be continued by the communication procedure of usual ITU-T recommendation T.30, without not performing the above-mentioned negotiation but becoming a communication link error again, since a DIS signal including the information which shows that there is no V.8 capacity in a responding station when it cannot communicate by the communication procedure of V.34 is sent out to a call origination office as a result of the negotiation in CM signal under communication link based on V.8 communication procedure, and JM signal.

[0109] In addition, at step 160, it replaces with step 152 - step 146 (refer to drawing 19), and may be made to perform step 120 - step 128 (to refer to drawing 15). In addition, step 114 is performed between step 112 and step 116 in this case. Or it may be made to perform step 140 - step 146 (to refer to drawing 17).

[0110]

[Effect of the Invention] As explained above, this invention during the communication link based on the communication procedure according to ITU-T recommendation V.8 When it is judged that this communication link is uncontinuable, in order to communicate based on the communication procedure which replaced with the communication procedure according to ITU-T recommendation V.8, and

applied to ITU-T recommendation T.30 correspondingly, In the communication procedure according to ITU-T recommendation T.30 V. by that which sends out and twists CI signal even if it receives the DIS signal with which the information which shows that there is 8 capacity was included It has the effectiveness that a communication link can be continued by the communication procedure according to ITU-T recommendation T.30, without being able to prevent that transmission of the DIS signal by the responding station and transmission of CI signal by the call origination office are repeated, and becoming a communication link error.

[0111] In this invention, moreover, during the communication link based on the communication procedure according to ITU-T recommendation V.8 When judged [that it cannot shift to the communication procedure according to ITU-T recommendation V.34, and], in order to communicate based on the communication procedure which replaced with the above-mentioned means of communications, and applied to ITU-T recommendation T.30 correspondingly, V. even if it receives the DIS signal with which the information which shows that there is 8 capacity was included, in the communication procedure according to ITU-T recommendation T.30 It has the effectiveness that a communication link can be continued by the communication procedure according to ITU-T recommendation T.30, without being able to prevent the repeat stage of this decision and becoming a communication link error, since it does not judge again whether it can shift to the communication procedure according to ITU-T recommendation V.34.

[0112] Furthermore, since the information which shows that it cannot communicate by the above-mentioned communication procedure is sent out when it is judged based on the communication procedure according to ITU-T recommendation V.8 that the communication link based on the above-mentioned communication procedure is uncontinuable during a communication link, Transmission of the DIS signal by the responding station since CI signal is not sent out from a call origination station, It has the effectiveness that a communication link can be continued by the communication procedure according to ITU-T recommendation T.30, without being able to prevent that transmission of CI signal by the call origination office is repeated, and becoming a communication link error.

[0113] In this invention, it is based on the communication procedure according to ITU-T recommendation V.8. Moreover, during a communication link Since the information which shows that it cannot communicate by the above-mentioned communication procedure is sent out when judged [that it cannot shift to the communication procedure according to ITU-T recommendation V.34, and], Since it does not judge again whether it can shift to the communication procedure which the communication link based on the communication procedure according to ITU-T recommendation V.8 was not performed, but applied to ITU-T recommendation V.34 correspondingly It has the effectiveness that a communication link can be continued by the communication procedure according to ITU-T recommendation T.30, without being able to prevent the repeat of this decision and becoming a communication link error.

[Translation done.]